No. 2

PROVISIONAL INTELLIGENCE REPORT

CAPITAL INVESTMENT IN THE CHEMICAL INDUSTRIES OF THE SINO-SOVIET BLOC 1951-55

CIA/RR PR-149
21 September 1956

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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Approved For Release 1999/09/26 : CIA-RDP79-01093A001100130010-2

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CIA/RR PR-149

(ORR Project 22.862)

NOTICE

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FOREWORD

This report is the result of a preliminary investigation of capital investment in the chemical industries of the Sino-Soviet Bloc during the 1951-55 period. The information available does not permit derivation of estimates of annual capital investments in the chemical industries of any of the countries of the Bloc except East Germany. The quantitative data given, therefore, are 5-year aggregate figures for the Bloc as a whole and for the various countries of the Bloc. These aggregates, and the ruble valuations to which some of them are converted, were derived by an experimental methodology. Both the data presented and the methodology used are subject to correction as new information becomes available.

In general, the estimates given in this report are tentative. Only those data taken from published CIA reports may be considered CIA estimates.

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CAPITAL INVESTMENT IN THE CHEMICAL INDUSTRIES OF THE SINO-SOVIET BLOC* 1951-55

Summary

During the 5-year period from the beginning of 1951 to the end of 1955 the chemical industries of the Sino-Soviet Bloc received almost 10 percent of total productive capital investment in all Bloc industry. Capital investment in Bloc chemical industries during the period amounted to about 36 billion rubles,** roughly equivalent to US $1.8 billion to $2.6 billion.*** During the same period, capital investment in the chemical, rubber, and allied industries of the US was about $7.2 billion. In 1955, capital investment in the chemical industries of the Bloc amounted to the equivalent of about $530 million. In the same year, capital investment in the US chemical industry was about $1.1 billion.

During 1951-55, about 70 percent of the capital investment in the chemical industries of the Sino-Soviet Bloc was concentrated in the USSR, a larger share of the investment than would seem warranted by the Soviet share of total Bloc production of chemicals. As coordination of Bloc-wide investment planning increases, this discrimination in favor of the USSR may decrease. Investment in the more underdeveloped countries of the Bloc now promises a higher return on the investment ruble.

Of the total amount of capital investment allocated to the chemical industries of the European Satellites during 1951-55, about 75 percent went to Poland, East Germany, and Czechoslovakia -- a share

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 February 1956.

** This figure includes 18 billion to 20 billion rubles allocated to equipment for replacement and for additions to productive capacity. It does not include 9 billion rubles allocated to nonproductive investment -- funds allocated to industrial housing and to social-cultural-educational facilities administered by the chemical industry.

*** This dollar equivalent is derived from a tentative ratio of 14 to 20 rubles to US $1. All dollar values are given in US dollars throughout this report.

of investment smaller, relatively, than the share of those three countries in Satellite production of chemicals. The underdeveloped chemical industries of Rumania, Bulgaria, and Hungary received the remaining 25 percent of the Satellite investment.

Communist China made significant progress in the expansion of the chemical industry during 1951-55, particularly during 1954 and 1955, and that expansion required large allocations of capital investment. The growth of the Chinese Communist chemical industry is dependent on equipment imported from other countries of the Sino-Soviet Bloc. This dependence reduces, in effect, the supply of equipment available for the expansion of the chemical industries in the exporting countries.

In these last 2 years of the 5-year period, there has been evidence of an increasing shortage of chemical equipment in the Sino-Soviet Bloc, particularly in the USSR, Czechoslovakia, and Hungary. The apparent need for the replacement of obsolete and obsolescent equipment, added to the requirements for equipment in new facilities, may increase the strain on the Bloc supply of chemical equipment during the 1956-60 period.

During recent years the distribution of capital investment in the chemical industries of the Sino-Soviet Bloc has been governed by certain objectives, objectives which have varied in relative importance from year to year and from country to country. These objectives are increased production of heavy industrial chemicals, exploitation of domestic chemical raw materials, independence from the Free World, increased production of explosives for defense, and adequate production of chemical fertilizers. Of these five objectives, production of chemical fertilizers appears to have been given high priority in 1955. The USSR plans to invest 20 billion rubles in the expansion of production of fertilizers from 1954 through 1963, and Poland, Hungary, Communist China, and North Korea have planned large increases in production. Expanded production of chemical fertilizers requires the expansion of facilities for the production of ammonia and nitric acid, both of which are vital to the manufacture of military explosives as well as agricultural fertilizers.

Continued development of the chemical industries of the Sino-Soviet Bloc is necessary to the development of a heavy-industry

base capable of supporting the economic and political aims of the Bloc. The program of capital investment in the chemical industries during 1951-55 supported a high rate of growth in production. It is probable that future investment will provide for a continuing rate of expansion in the Bloc production of chemicals significantly higher than the current rate of expansion in US production.

I. Introduction.

A. Significance of Capital Investment in the Chemical Industries of the Sino-Soviet Bloc.

In the countries of the Sino-Soviet Bloc the chemical industries have been growing at a faster rate than industry as a whole. This phenomenon is not peculiar to Communist countries; similarly rapid growth has characterized the chemical industry throughout the world. In order to analyze the future capabilities of the chemical industries of the Bloc, the causes of growth must be studied in detail.

Capital investment is a major factor in economic growth. A Polish text states that "75 percent of the rise in the productive capacities of nearly every major branch of the chemical industry occurs as a result of investment activities." 1/* A discussion of the Czechoslovak First Five Year Plan (1949-53) states that "the plan for capital investments is one of the most basic component parts of the whole economic plan, because it determines the tempo and direction of economic development and simultaneously the height of the living standards of the population." 2/

Information concerning both the amount of capital investment and its structure is important to economic intelligence. Analysis of this information may indicate the establishment of an industrial policy or the existence of significant changes in policy. Estimates also may be made concerning the availability or the shortage of capital equipment and the capabilities of the construction industry in the chemical field.

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* For serially numbered source references, see Appendix D.

1. Amount of Capital Investment.

In the short run there may be a direct relationship between the amount of capital investment and the increased production of a particular industry.* Where this is true, information concerning a proposed investment program would permit estimates of the volume of production at the end of the investment period. The validity of this type of analysis, however, has not been fully established for the chemical industry, although capital coefficients have been employed in East German planning.** Also, available information on capital investment in the chemical industry usually concerns the whole industry and is not broken down by category. This introduces a problem because the industry is heterogeneous.

For the chemical industry as a whole, the ratio of capital investment to increased production is likely to be unstable over a short period. This instability would be the result of volatile shifts of investment to different processes which are based on different materials and produce a different schedule of final products compared with those of the preceding period. The chemical industry is both complex and dynamic.

Nevertheless, analysis of the amount of capital investment in the chemical industry as a whole provides measures of the importance and cost of expansion of production planned for that industry. In addition, knowledge of the total investment in that industry provides a means of assessing the importance of individual investment projects within the industry or its component sectors. In the postwar years, for example, a large share of over-all investment in the chemical industry has gone into expanding production of chemical fertilizers.***

Ultimately, detailed analysis of the amount and distribution of capital investment in the chemical industry may produce evidence useful in evaluating expansion in fields related to Sino-Soviet military capabilities, such as the fields of explosives, nuclear energy, chemical warfare, and bacteriological warfare. Estimation of the over-all scale of investment in the chemical industry is a preliminary step in such analysis.

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* This relationship is frequently called a "capital coefficient."

** See Appendix A.

*** See V, A, p. 19, below.

2. Replacement and New Investment.

Capital investment in any given period consists of capital replacement and new additions to fixed assets. Until recently, the emphasis in the USSR has been on new additions. When the chemical industry was relatively new, replacement* of depreciated assets was slight in relation to the value of the new plants being erected. Later, replacement was minimized deliberately.** Amortization allowances were set low. Few steps were undertaken to reduce the higher costs of production resulting from the use of obsolete or obsolescent facilities. Policy declarations for the Sixth Five Year Plan (1956-60) of the USSR indicate that this situation will be changed, and there is already substantial evidence that the entire Sino-Soviet Bloc will attempt to devote more capital investment to the replacement of inefficient facilities during 1956-60.***

A shift in the structure of capital investment probably would affect the rate of expansion of the chemical industry. This problem will be further discussed in Section V.****

3. Investment Policy.

Capital investment policy in the Sino-Soviet Bloc, as established in the Five Year Plans, the annual State Economic Plans, and the annual budgets, is a potential indicator of intentions, especially if the annual capital investment plan for a given year differs significantly from the scale of investment projected in the long-term plan. The use of investment data as indicators of intentions, however, applies particularly to data for total capital investment and for total industrial capital investment. Official announcements rarely give enough data on capital investment in the chemical industry to disclose significant variations in policy. Such data as are available for capital investment in the chemical industry are a major source of determining which products may be emphasized in future expansion of the industry.

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* The term replacement as used in this report must be distinguished from the reconstruction of war-damaged assets.

** The apparent policy was to keep old equipment running even after new equipment was installed and in operation. Such a policy ignores the high cost of operating outmoded equipment.

*** See IV, p. 17, below.

**** P. 19, below.

4. Supply of Equipment and Fulfillment of Construction Plans.

In the past, several European Satellites have found their plans for expansion of the chemical industry impeded by shortages of equipment or by inadequate performance by the construction industry. Such hindrances may be of key significance, and, in many cases, analysis of investment data may help detect their existence.

B. Components of Industrial Capital Investment.

Industrial capital investment consists of the additions to the material assets of industry within a specific time period. Industrial capital investment in the USSR includes the value of construction materials and construction labor used in building necessary structures and preparing the sites, the value of the equipment purchased, and the cost of its assembly.

In the Sino-Soviet Bloc, about 15 to 20 percent of the total industrial capital investment in a given year is for "nonproductive investment."* In the USSR the construction of industrial towns for plants not located in established communities causes nonproductive investment to be large. In East Germany, however, a larger percentage of plant construction is in established communities, and the requirements for housing construction out of the industrial budget are correspondingly smaller.

C. Gross and New Capital Investment.

In the countries of the Sino-Soviet Bloc, announced data on capital investment include major categories of expenditure for the replacement of obsolete or obsolescent equipment.** In an industrially developed country such as Czechoslovakia, as much as one-third of gross industrial capital investment covers replacement, 3/ which leaves only two-thirds of gross investment as investment for new productive facilities.

* The term nonproductive investment as used in this report includes investment in workers' housing, health facilities at the plant, sports facilities for workers, and cultural facilities.

** Repairs to capital assets are usually financed from enterprise resources, such as the retained share of the amortization deductions, and are not included in the capital investment plan. They were removed from the capital investment plan in the USSR in 1937 and in Poland and Czechoslovakia in 1950 and 1951.

In the USSR, according to the Second Five Year Plan (1933-37), 74 percent of total capital investment in the chemical industry in the Peoples Commissariat of Heavy Industry was intended for new investment, implying that 26 percent was for replacement. 4/ According to the 1954 plan for capital investment in the Chemical Area of the East German Ministry for the Chemical Industry, only one-third of the total was intended for new investment, and two-thirds was destined for replacement. 5/ In countries which have been industrialized recently, such as Bulgaria and Rumania, replacement of depreciated capital is small relative to total investment.

From preliminary statements on the 1956-60 Five Year Plans, it is clear that although a high rate of gross capital investment (including replacement) will be maintained in the Sino-Soviet Bloc, a higher proportion of investment will go to the modernization and renovation of existing plants and equipment. The proportion of new capital investment will decline. Rumania and Bulgaria will be exceptions to this change in emphasis and will maintain a high rate of net capital investment. Neither country yet faces an extensive depreciation problem.

D. Sources of Capital Investment Financing.*

In countries of the Sino-Soviet Bloc, more than 90 percent of capital investment is governed by the Capital Investment Plan of each country. This plan is a specific component of the State Economic Plan. Investment outside of this plan consists of certain categories of small, decentralized expenditures and larger expenditures by kolkhozes or similar agricultural organizations. Such extraplan investment is insignificant in the chemical industry.

The state budget of each country is now the major source of funds for investment under the Capital Investment Plan. Other funds are supplied from the "own funds" of enterprises. Generally, these "own funds" consist of retained profits directed to capital investment; amortization charges directed to capital investment rather than to capital repair; and funds, minor in importance, known as "mobilization of the internal reserves" of the enterprise. During the Soviet Fifth Five Year Plan (1951-55), the extent of "own funds" financing in the USSR was exaggerated by a bookkeeping trick. General

* Data in this section refer to total capital investment, not to capital investment in the chemical industry only.

price and wage reductions which affected the cost of capital investment were not considered as lowering the value of planned investment but rather were considered as a source of "own funds" capital to finance the planned scale of investment. This practice does not seem to have been followed in the European Satellites. In both the USSR and East Germany, reductions in the cost of construction because of more efficient work are considered as a source of investment capital, although this is true only in a bookkeeping sense.

In the European Satellites, 15 to 20 percent of the financing of the Capital Investment Plan comes from sources outside the budget. 6/ In the Soviet 1955 plan, 34.6 percent was to be financed from nonbudgetary sources. This figure, however, was inflated by the inclusion of the total value of the price reductions of January 1952. 7/ The 1956 Soviet plan contained the more realistic figure of 26.4 percent. 8/ Because of a change in the price basis for evaluating capital investment, no price reductions were included under "own funds" financing. Although Communist China also has the same nonbudgetary sources of financing, neither profits nor amortization payments contribute significantly to capital investment, and 96.7 percent must come from the state budget. 9/

Before 1951, capital investment in Poland was progressively centralized, and private investment was progressively reduced. To this end, capital investment financing was concentrated in the state budget. In 1951, 94.8 percent of the financing came from the budget. 10/ In the 1955 plan, however, only 78.1 percent of the industrial capital investment was expected to be budgetary, 11/ reflecting an increasing emphasis on the retention of enterprise profits and the use of a significant share of the amortization payments as a source of financing.

In Bulgaria the budget supplied 80.4 percent of the capital investment financing in 1951 and 85.9 percent in 1952. 12/ In Rumania, 77.5 percent came from the budget according to the 1953 plan, and in the 1954 plan only 61.6 percent was expected to come from the budget. 13/

The favored procedure for capital investment financing is for an enterprise to draw on its "own funds" to the maximum possible extent before drawing on authorized budgetary funds. A substantial portion of capital replacement is therefore financed from nonbudgetary sources, which, however, are still subject to the

investment planning controls. On the other hand, a new plant under construction has no "own funds" and must be financed almost entirely out of budgetary funds.

In many cases, the term "own funds" is misleading. By law a certain share of enterprise profits and of enterprise amortization allowances must be set aside to finance capital investment. Generally, these funds are paid to the Investment Bank of the particular country, where they are available for authorized withdrawals. To the extent that an enterprise does not conduct capital investment equal to the funds it has remitted, it is financing capital investment in other enterprises. In such a case, the Soviet term "own funds" acquires a cynical aspect.

II. Amount of Capital Investment.

Information concerning the monetary value of capital investment in the chemical industry provides an over-all measure of the expansion of the chemical industry in terms of construction labor, construction materials, and additions to the inventory of production equipment.

In comparing the relative scale of expansion among the countries of the Sino-Soviet Bloc, the selection of the time period is particularly important. The 1946-50 period was one of unusual investment patterns because of the postwar reconstruction. The 1951-55 period is more representative and provides a useful base for analysis of the 1956-60 plans.

A comparison of average annual capital investment in the chemical industries of the Sino-Soviet Bloc during 1951-55 shows the relative sizes of the investment programs of the countries of the Bloc. This comparison is given in Table 1.*

A. Extent of Effort.

During 1951-55 the average annual gross capital investment in the chemical industries of the Sino-Soviet Bloc was approximately 9 billion rubles, or 45 billion rubles for the period. This figure would be roughly comparable with US capital investment in the chemical, rubber, and allied products industries except for the inclusion

* Table 1 follows on p. 10.

Table 1

Average Annual Capital Investment in the Chemical Industries of the Sino-Soviet Bloc a/
1951-55

Billion Rubles b/

Country	Expenditure
USSR	6.30
Poland	0.92
Czechoslovakia	0.50
East Germany	0.47
Hungary	0.25
Rumania	0.23
Communist China, North Korea	0.20
Bulgaria	0.09
Total	8.96

a. For the methodology used to compile this table, see Appendix B. The figures given include nonproductive investment.
b. The approximate price level in rubles of July 1950 (see Appendix B).

of nonproductive investment, which was one-fifth of the total. The indicated total capital investment in the chemical industries of the Bloc during 1951-55, excluding nonproductive investment, was almost 36 billion rubles.

According to the Manufacturing Chemists Association, capital investment in the chemical, rubber, and allied products industries of the US during the same period was about $7.2 billion. Unfortunately, no over-all dollar-ruble ratio has been derived which can be applied to the entire Sino-Soviet Bloc. Based on comparisons of the prices of a few articles of comparable equipment, the ratio should fall between

14 and 20 rubles to $1. This ratio would indicate a dollar value of $2.3 billion to $3.2 billion for capital investment in the Bloc chemical industries during 1951-55. After deducting the one-fifth of investment which goes to housing and "social, cultural, and educational" facilities and which is not normally included in similar US data, the range would be $1.8 billion to $2.6 billion.

In 1955, capital investment in the chemical industries of the Sino-Soviet Bloc was much larger in comparison with that in the US. Although in 1953, at the height of the expansion following the Korean War, the US invested more than $1.5 billion in plants and equipment for the chemical industry, slightly more than $1.1 billion was invested in 1955. On the other hand, the entire Bloc probably invested about 10.5 billion rubles, possibly as much as 11.7 billion rubles, for the same purpose in the same year.* Of this, 8.6 billion to 9.4 billion rubles would have been for productive investment. Using the same ruble-dollar ratios, the value of this productive investment would have been about $530 million.

The comparative effectiveness of the high rate of investment in the Sino-Soviet Bloc is lessened by the high share of total capital investment which is invested in the construction of buildings and structures. Unfavorable climate, relatively inefficient construction techniques, and higher construction costs all inflate the cost of the construction of buildings and structures. Therefore, although the equivalent dollar value of capital investment (excluding nonproductive) in the chemical industries of the Bloc may have been 48 percent of US investment in 1955, increased production of chemical products would have been less than is indicated by this ratio.**

* During 1951-55 the size of capital investment in the chemical industries of the Sino-Soviet Bloc increased at an annual rate of about 15 percent. If this rate of increase were constant, investment in 1953 would have approached the average investment for the period, and investment in 1955 would have been about 30 percent higher than in 1953. This is the basis for the maximum estimate of 12 billion rubles. Because increases in annual investment actually lessened somewhat after 1953 because of the "new course" and because of the normal pattern of using the last 2 years of a 5-year plan to complete construction begun in the earlier years, it is quite possible that investment in 1955 would not have been more than 11 billion rubles.

** This statement is based on the fact that expansion in productive equipment has the most direct ultimate effect on expanded production of chemicals.

B. Relative Extent of Effort, by Country.

1. General.

The years 1951-55 were a period of transition from much exploitation of the Satellite economies by the USSR to intensified coordination of production and investment planning. Total capital investment in the chemical industries of the European Satellites and of Communist China and North Korea was about 30 percent of the total for the Sino-Soviet Bloc and 43 percent of the total for the USSR. Capital investment in Communist China and North Korea during the period was less than 2 percent of the total for the Bloc, but large-scale programs in these countries did not begin until 1953.*

The USSR was the favored location for chemical construction. Although the other countries of the Sino-Soviet Bloc received 30 percent of the capital investment, they produced about 40 percent of the chemicals produced in the Bloc. 14/

The disproportionately low share of capital investment allotted to the European Satellites indicates that for the 1951-55 period as a whole, chemical construction in the Satellites was not given equal priority in Soviet planning with construction in the USSR. Nevertheless, the program undertaken in the European Satellites was extensive and has led to great increases in production of chemicals. This expansion is remarkable because it drew heavily on equipment either manufactured in the USSR or furnished to the USSR by the Satellites and potentially available for projects in the USSR.

Many recent statements by Communist leaders indicate that future capital investment planning in the Sino-Soviet Bloc is to be coordinated to a much greater extent. The patterns of investment will be established by a division of labor among the countries; each country will produce those items which it can best produce and which are of utility to the Bloc and to the individual country. This was not the deliberate policy of the 1951-55 plans, and achievement of these aims can be evaluated only after the Bloc is well into the 1956-60 planning period.

* Data in this paragraph are based on the following adjusted totals for average annual capital investment: Sino-Soviet Bloc, 8.9 billion rubles; USSR, 6.3 billion rubles; European Satellites, 2.4 billion rubles; and Communist China and North Korea, 0.2 billion rubles.

2. East Germany, Czechoslovakia, and Poland.

During 1951-55, slightly more than 75 percent of the capital investment in the chemical industries of the European Satellites was concentrated in East Germany, Czechoslovakia, and Poland. This concentration indicates underinvestment in these countries relative to their scale of chemical production, which was about 92 percent of the total in the European Satellites. 15/ This was expected, however, because the chemical industries of these countries were relatively well developed, and investments concentrated in the underdeveloped chemical industries of Hungary, Rumania, and Bulgaria would bring relatively high returns in increased production. Soviet technical assistance, which was concentrated in Hungary, Rumania, and Bulgaria, was a major factor in the difference between the two groups.

East Germany is an example of retarded capital investment in the chemical industry. Large investments occurred because of special conditions, the need to complete reconstruction, and the need to be more independent of West Germany and other Western countries. Nevertheless, the investment program was small in relation to the revenues produced by the chemical industry and in comparison with the expansion programs of Poland and Czechoslovakia. Establishment of a metallurgical industry drew heavily on investment capital, and the chemical industry was one of the industries which suffered from this emphasis. 16/ Although East Germany has had to devote a comparatively low percentage of investment to nonproductive investment such as ministerial financing of industrial housing, a very high percentage -- almost two-thirds -- of capital investment in the chemical industry goes to replacement. A substantial part of investment, therefore, goes to maintain the present level of production.

In spite of the smaller size of the chemical industry of Poland, capital investment in the Polish chemical industry was almost double that in the East German industry.

Gross capital investment in the chemical industry of Czechoslovakia appears to have been about the same as in the East German industry. Production in Czechoslovakia is considerably smaller than in East Germany; expenditures in Czechoslovakia, therefore, will result in a higher percentage rate of growth than in East Germany. Poland has greater production of chemicals and greater capital investment than Czechoslovakia and should maintain its lead over Czechoslovakia in the production of chemicals.

3. Rumania, Bulgaria, and Hungary.

Rumania, Bulgaria, and Hungary possess abundant but underdeveloped chemical resources. In Hungary, expansion has been mainly in production of chemicals which would help its agriculture, and much of the expansion has been in areas distant from the heavy concentration of production of chemicals in the Budapest area.

Expansion of the chemical industry in Bulgaria has been gigantic in comparison with the previously almost nonexistent chemical industry but insignificant relative to over-all expansion in the Sino-Soviet Bloc. Replacement is still an insignificant item in capital investment in Bulgaria.

Expansion in Rumania and Hungary is on a comparable scale and is significant even in comparison with the programs of East Germany and Czechoslovakia. Future plans for expansion in Rumania indicate a major investment effort. In both countries, new investment is the major component of the total capital investment in the chemical industry.

4. Communist China and North Korea.

With its First Five Year Plan (1953-57), Communist China launched a major expansion program in the chemical industry. The 7 fertilizer plants which are to be constructed or begun -- 5 nitrogenous fertilizer plants and 2 phosphorous fertilizer plants -- indicate the size of the program.

In 1955, capital investment in the chemical industry of Communist China probably was about 400 million to 450 million rubles, about 4 percent of total investment in the chemical industries of the Sino-Soviet Bloc. In the same year, investment in the chemical industry of East Germany was about 550 million rubles. The amount of investment in China, therefore, was about 75 percent of that in East Germany, and a much higher percentage went to new investment. It can be seen that the Chinese Communist expansion program would be a burden on the strained chemical equipment industries of the Bloc because China can manufacture little of the equipment required. Chinese investment activities in the chemical industry probably will have to be accelerated, 17/ and the full strain of the program on Bloc resources is yet to be seen.

A similar analysis gives an estimate of capital investment in the chemical industry of North Korea, which is about one-tenth as large as the program in Communist China and smaller than the program in Bulgaria. The program in North Korea is directed almost entirely to reconstruction of war-damaged plants and is dependent on other countries of the Sino-Soviet Bloc for equipment. It is doubtful that one-half of the war damage to the chemical industry (10 billion won, or more than 300 million rubles) could be repaired even by the end of 1956. 18/

III. Distribution of Capital Investment.

Determination of the aggregate size of capital investment in the chemical industry has intelligence applications for some problems, and examination of the distribution of capital investment is significant. Information about the products or groups of products that are receiving priority in the use of investment capital and the reasons for their priorities is useful. Although detailed analysis is possible only in studies far more intensive than this memorandum, some examples of such analysis can be given.

In a planned economy the distribution of capital investment ultimately reflects priorities assigned on the basis of policy decisions. An official Czechoslovak analysis gave five of the major criteria which governed investment in the chemical industry of Czechoslovakia. 19/ These criteria seem to apply to the investment programs of all the countries of the Sino-Soviet Bloc, with the relative emphasis varying according to the particular circumstances of the country. The five criteria are increased production of heavy industrial chemicals, exploitation of domestic chemical materials, independence from the West, increased production of explosives for defense, and adequate production of fertilizers.

The chemicals essential to the buildup of heavy industry and to the development of economic strength are ammonia, sulfuric acid, caustic soda, chlorine, calcined soda, and many others. Exploitation of domestic chemical materials involves development of the chemical mining industry and development of resources such as salt, potash, phosphorite, and gypsum. To become independent of the West, it will be necessary either to produce or to import from other countries of the Sino-Soviet Bloc those essential materials which have been imported from the West.

The impact of this pattern of development can be seen in the USSR in data pertaining to the First Five Year Plan (1928-32). 20/* In the plan year 1928/29, basic chemicals received 49 percent of the total capital investment in the chemical industry; in 1931, 59 percent. In 1928/29 the chemical mining industry received 4 percent of total investment. In 1932 it received 11 percent.

One of the more significant aspects of capital investment in the countries of the Sino-Soviet Bloc since World War II has been the emphasis on expansion of the chemical fertilizer industry. This industry is the only sector of the chemical industry which is covered by all five criteria for investment. It involves expansion of production of heavy chemicals such as ammonia and sulfuric acid. The program is based on resources of the Bloc and is designed not only to create adequate supplies of fertilizers independent of imports from the West but also ultimately to attain independence of the food supplies of the West. Finally, the ability of certain types of fertilizer plants, especially nitrogen plants, to make materials needed for explosives gives them the priority of defense.

In the USSR, 50 percent of the capital investment in the chemical industry during 1946-50 was intended for reconstruction and construction of new plants for production of mineral fertilizers and insecticides. 21/ In 1955 the Soviet government proposed a 10-year, 20-billion-ruble program for the construction of new plants for production of nitrogenous, potassium, and phosphorous fertilizers during 1954-63. 22/ The USSR did not meet production goals for production of synthetic fertilizers in 1955, a fact which indicates grave problems in its expansion program.

In Communist China a major feature of the 1953-57 plan is commencement of construction of 5 nitrogenous fertilizer plants and 2 phosphate fertilizer plants. 23/ A Hong Kong periodical states that two-thirds of all state investment in chemicals will be devoted to chemical fertilizers. 24/

North Korea has accelerated capital investment in production of chemical fertilizers, which had already received top priority in the Three Year Plan (1954-56). 25/ Reconstruction of chemical fertilizer plants is to receive a larger amount in 1956 than total investment in the chemical industry received in 1955. 26/

* Data given in this paragraph are from a single statistical source and are fully comparable in terms of the classification used.

In Hungary the Kazincbarcika Fertilizer Plant has accounted for a major portion of construction in the chemical industry during the last 5 years. Nevertheless, 2 months after the completion of the plant the Chairman of the Council of Ministers declared that Hungary must increase its synthetic fertilizer capacity at a higher rate and also must build another new plant. 27/

In Poland, one-third of the capital investment in the chemical industry in 1950 was intended for expanded production of synthetic fertilizers. 28/ In late 1955 an official journal declared that it was the chief task of the chemical industry to expand production of synthetic fertilizers and plant protection agents (insecticides and fungicides). To attain this end, it was necessary to expand three major plants and to build new ones. 29/

As the resources of the chemical industries of the Sino-Soviet Bloc become more adequately developed, some significant shifts in the pattern of capital investment are likely to occur. Increasing emphasis on development of organic synthesis production has been noticeable in recent years. This sector provides the basis of much of the plastics industry and of many intermediate products important to a modern economy. Because of the urgent need to increase agricultural production in the Bloc, emphasis on expansion of production of fertilizers will continue.

IV. Share of Equipment.

The value of equipment represents about 40 to 45 percent of the total annual capital investment in the chemical industries of the Sino-Soviet Bloc.*

The Soviet equipment category includes instruments, equipment, machinery, and initial office supplies for new plants. Equipment costs are carried exclusive of the cost of assembling the equipment at the construction site. 30/ Assembly costs are included in the investment category "construction-assembly work." In the US, many contracts include the cost of the assembly of major pieces of equipment in the total equipment cost. Therefore, depending on the nature of the data, there may not be strict comparability between figures on equipment cost in the US and the USSR. Soviet data are understated by the complete exclusion of assembly cost.

* Percentages apply to data including nonproductive investment.

The share of total capital investment in the chemical industry going into equipment has been determined from data on East Germany and the USSR. In East Germany, 50.3 percent of the total investment went to equipment in 1951. 31/ According to the First Five Year Plan (1951-55) of East Germany, the share of equipment was to range from 56 percent in 1951 to 33 percent in 1952. The unweighted average for the 5 years was 44 percent. 32/

In the USSR, data on the composition of the fixed assets of the chemical industry of the Peoples Commissariat for Heavy Industry in 1937 give the best picture of the relative share of chemical equipment in capital investment. 33/ In the fixed assets for 1937, equipment was 45 percent of total productive fixed assets, or 36 percent of productive fixed assets plus nonproductive assets.* By 1955 a trend toward increasing the share of total investment devoted to equipment probably has brought the proportion up to that of East Germany -- about 45 percent of total annual capital investment.

In 1954 and 1955 there has been increasing evidence of shortages of equipment needed by the chemical industry. The USSR underfulfilled the over-all plan for production of chemical equipment in 1954, although a 14-percent increase over 1953 production was achieved. 34/ In 1955 the plan was probably underfulfilled more seriously, because production during the first half of the year was only 5 percent above production in the same period in 1954. 35/ In Hungary, Erno Gero, First Deputy Chairman of the Council of Ministers, confessed in November 1955 that chemical production was lagging "because our production of chemical equipment is lagging." 36/ Shortages were hampering the expansion of the Czechoslovak chemical fertilizer industry in 1955, all the more significant because of the priority usually given to expansion in this field. Construction of a nitrogen plant at Ostrava has been hampered by delays in the delivery of equipment, as has been progress at a chemical fertilizer plant at Lovosice. 37/

During 1951-55 the chemical industry of the USSR received 11 percent of the total value of equipment delivered to industry, averaging about 2.8 billion rubles** of an average annual industrial equipment bill of 26 billion rubles. 38/ During the same period, total expenditures on equipment for the chemical industries of the Sino-Soviet

* Nonproductive assets are considered to be 20 percent of total assets.
** Forty-five percent of 7.6 billion rubles.

Bloc ranged from 18 billion to 20 billion rubles. In 1955 the total bill for equipment probably was about 5 billion rubles.

V. Capital Investment Policy in the Chemical Industries of the Sino-Soviet Bloc, 1956-60.

During 1956-60 there will be shifts in the sectors of the chemical industries of the Sino-Soviet Bloc which receive priority in capital investment, increased emphasis on modernization of facilities and improved technology, and increased coordination of investment among the countries of the Bloc.

A. Priority Sectors.

During 1956-60 there will be continued emphasis on the development of chemical raw materials and on the expansion of production of heavy industrial chemicals. Priority expansion of production of chemical fertilizers will continue. There will be some shift in favor of increased emphasis on expansion in the field of organic synthesis, especially in plastics and synthetic fibers.

In East Germany the priority will be given in 1956-60 to processing brown coal, expanding production of inorganic basic materials, expanding production of plastics, and expanding production of synthetic fibers. 39/

In Czechoslovakia, expansion of production of heavy industrial chemicals is to continue, but a shift is to begin toward the field of basic organic synthesis. The shift is to become more pronounced in the Third Five Year Plan (1961-65). In the Second Five Year Plan (1956-60), new construction will expand production of nitrogenous fertilizers, sulfuric acid, carbide, plastics, and synthetic fibers. Production of synthetic rubber will be begun. 40/

In Poland the priorities are to be in the fields of mined chemical raw materials, chemical organic synthesis intermediate products, synthetic fibers, plastics, rubber, and pharmaceuticals. 41/

In Hungary, chemical processing is to be favored in a shift from the relatively expensive development of domestic chemical raw materials. Production of fertilizers, plastics, and synthetic fibers will be greatly expanded in the new Tisza Region Chemical Combine, which will be the largest chemical project of the new Five Year Plan (1956-60). 42/

In Rumania a very large expansion program is planned which will continue the development of Rumanian chemical resources and will intensify development of organic synthesis production. Expanded production of chemical fertilizers, caustic soda, chlorine, plastics, synthetic fibers, and synthetic rubber will be emphasized. 43/

In Bulgaria, plans call for expansion in the field of heavy industrial chemicals and joint construction projects with the formal aid or participation of other European Satellites. 44/

B. Increased Emphasis on Replacement.

Recent official announcements indicate that the countries of the Sino-Soviet Bloc which have large existing facilities for production of chemicals will devote a larger share of their capital investment to replacement of inefficient facilities. This is especially true of the USSR, East Germany, Poland, Czechoslovakia, and -- to a lesser degree -- Hungary. 45/

In the past, replacement was handicapped by inadequate financing and by a general preference for investment in new productive units. Amortization rates were generally low, and as a rule a very high percentage of the amortization deductions were not retained in the plant itself for its own replacement needs but were returned to the state. The state then used these sums for capital investment, either replacement or new investment.

The neglect of replacement resulted in excessive production costs. The newest plants achieved low production costs, but the oldest plants were extremely costly to operate. The excessive consumption of labor and materials in the older plants drew upon materials which could have been used for new capital investment and retarded progress toward the Soviet economic goal of achievement of the maximum possible rate of economic growth.

C. Future Coordination of Investment Planning.

The Sino-Soviet Bloc press has published many statements concerning increased coordination of planning, including capital investment planning, to occur during 1956-60 among the countries of the Bloc. 46/ Information now available covers primarily binational planning of specific future projects. Bulgaria and Czechoslovakia have been discussing joint construction of two new cellulose plants. 47/

Hungary and Rumania will continue extensive cooperation which began on the basis of improving exploitation of Rumanian methane gas resources as a chemical raw material.

Strains on the aggregate supply of equipment needed for expansion of the chemical industries of the Sino-Soviet Bloc will compel careful allocation of available equipment. There are already evidences of shortages of equipment, and equipment is to represent an even more important share of future capital investment in the chemical industries of the Bloc. Careful planning of the allocation of equipment resources will mean the difference between success and failure in realizing planned expansion, and even careful planning will not achieve success if the chemical equipment industries do not meet their goals. Imports of specialized chemical equipment and advanced chemical technology from the West will greatly facilitate achievement of the planned goals.

APPENDIX A

EAST GERMAN CAPITAL COEFFICIENTS USED IN CURRENT INVESTMENT PLANNING

East German planning officials devised a series of capital coefficients applicable to the 1955-60 expansion programs of the Main Administrations of the Chemical Area of the Ministry for Heavy Industry. These coefficients express the annual increase in production resulting from an annual capital investment of 1 million East German marks (DME), as follows:

Main Administration for Heavy Chemistry	1.43 million
Main Administration for General Chemistry*	2.06 million
Main Administration for Liquid Fuels	0.76 million
Main Administration for Potash and Non-metallic Ores	0.35 million
Main Administration for Plastics	1.93 million

This information reveals that expansion in the production of liquid fuels and in the mining of chemical ores requires the greatest amount of investment per unit of additional output. Heavy industrial chemicals and plastics require much less investment in relation to the additional production which results. General chemistry gives the best value in terms of additional output resulting from an investment mark, yet because of its consumer orientation, it is scheduled to receive the least in additional investments. 48/

* This main administration produces specialty chemicals and many consumer chemicals such as soap and paints.

APPENDIX B

METHODOLOGY

Table 1* presents the basic methodological problem of this report, which was to find a means of assessing the relative size of the capital investment programs in the chemical industries of the Sino-Soviet Bloc for a recent period, preferably covering several years. The 1951-55 period was selected for the reasons given in Section II.**

Because nine different currencies were involved, the use of a common currency for comparison became a major problem. For several reasons the ruble is used as the common currency in this memorandum. First, recent currency reforms have defined the currencies of the European Satellites in terms of rubles. Second, changes in the economic structure have created cost structures*** throughout the Sino-Soviet Bloc, with the possible exception of those in the southern European Satellites, which are similar to the structure found in the USSR. Third, use of the ruble basis makes it possible to use a ruble-dollar ratio in calculating the dollar-equivalent value of capital investment programs instead of using separate ratios computed for each separate currency. Use of the ruble basis involves an assumption which should be tested if possible, but it is believed that valid conclusions can be drawn from this memorandum without awaiting the derivation of capital investment ruble-dollar ratios for each country of the Sino-Soviet Bloc.

To bring about a basic readjustment of the price structure in the Sino-Soviet Bloc, the USSR has effected a major currency reform in all of the European Satellites except East Germany and Hungary. In Poland this reform took place in 1950; in Rumania and Bulgaria, in 1952; and in Czechoslovakia, in 1953. The conversion ratios used in this report to convert costs in the old (prereform) currency to costs in the new (postreform) currency are those used in a Soviet source. 49/

The derivation of ruble estimates of annual average capital investment in the chemical industries of the Sino-Soviet Bloc is shown in Table 2.****

* P. 10, above.
** P. 9, above.
*** The term cost structure is used in the sense of the relative pricing of investment goods, agricultural goods, and consumer goods.
**** Table 2 follows on p. 34.

1. USSR.

Total capital investment in the chemical industry of the USSR during 1951-55 is estimated to have been 31.5 billion rubles* in the costs of July 1950. The average annual investment was 6.3 billion rubles.

A key to the derivation of this estimate was the statement that the planned scale of capital investment in the chemical industry during 1946-50 was to be equal to the total investment for the 3 preceding Five Year Plans. 50/

Total capital investment in the chemical industry for the period from 1928 to June 1941 was between 12.2 billion and 14 billion rubles, on the cost basis of the individual Five Year Plans. From 1928/29 to 1932, 1.46 billion rubles were invested. 51/ According to the Second Five Year Plan (1933-37), 4.77 billion rubles were to be invested in the chemical industry in the Peoples Commissariat of Heavy Industry. 52/ These plants constituted between 70 and 75 percent of the productive capacity of the chemical industry; thus the expanded investment total would have been about 6.5 billion rubles. The average cost level of investment during the 5 years was about that of 1933, which was the cost level of the plan figures; therefore, it makes little difference if current costs or plan costs are used as the cost basis for total investment in this period. It is probable that the plan was underfulfilled, and the lower level of the range of estimate (5.2 billion rubles) is based on an assumed 20-percent underfulfillment. In the 1941 plan, capital investments for the Peoples Commissariat of the Chemical Industry were scheduled to be 1.176 billion rubles. There was little cost variation during 1938-41, so that the cost level probably is representative. The Commissariat probably controlled 70 to 75 percent of the productive facilities of the chemical industry, so that an expansion to a full-coverage basis is required. In 1940, projected increases in the scale of long-term capital investment had already been reduced because of the imminence of war; therefore, the 1941 plan level of investment probably reflects the average annual level of investment for the period from 1938 through the first half of 1941. Adjusting to a full-coverage basis and applying the planned level of investment to 3-1/2 years, an estimated total capital investment of 5.6 billion rubles is derived.

* This total includes an estimated 20 percent of nonproductive investment.

Based on these data, the Fourth Five Year Plan (1946-50) called for an estimated total capital investment of 12.2 billion to 14 billion rubles in 1945 costs.

According to data given by Khrushchev at the XXth Party Congress, during the Fifth Five Year Plan, total capital investment in the chemical industry increased 80 percent over the corresponding total for the Fourth Five Year Plan. Because this figure probably applies to investment in the Ministry of the Chemical Industry, it must be adjusted upward to allow for faster growth in investments in pharmaceuticals and coke chemicals because neither field is included in the Ministry of the Chemical Industry. Accordingly, it is probable that investment in the chemical industry as a whole doubled during 1951-55. The range of estimate, in 1945 prices, is 24.4 billion to 28 billion rubles. These figures should be inflated 20 percent* to the cost level of July 1950 which was used as the plan costs of the Fifth Five Year Plan (1951-55). Thus the range becomes 29.3 billion to 33.6 billion rubles, with 31.5 billion rubles as the best estimate of total capital investment in the chemical industry of the USSR during 1951-55.

Capital investment in 1953 probably was close to the average annual investment during 1951-55, or 6.3 billion rubles. Total industrial capital investment in this year was about 90 billion rubles. Investment in the chemical industry was therefore about 7 percent of total industrial investment compared with a relationship of 7 to 11 percent for the period immediately preceding World War II.

2. East Germany.

It is probable that the First Five Year Plan goal of 1.7 billion DME for capital investment in the chemical industry of East Germany was not met.** A major effect of this failure was underfulfillment of the original production targets for 1955 (the 1955

* The inflation factor has been derived on the basis of the industrial capital investment cost index given in 53/.

** The First Five Year Plan, however, was defined in more comprehensive terms than subsequent information; hence there is some lack of comparability. The pharmaceutical industry, for example, was included in the First Five Year Plan but excluded from chemical investment data after 1953.

annual plan, drawn up in 1954, projected a lower level of production for 1955 than did the First Five Year Plan, so that these goals may have been overfulfilled). Shortcomings in production of chemical equipment in East Germany and diversion of large quantities of equipment to other Sino-Soviet Bloc countries are prominent causes of the failure to meet the plan goals for the chemical industry.

The year 1951 was characterized by administrative changes which led to the issuance of two sets of plan fulfillments for the respective organizations existing before and after the reorganization. The plan for the original Main Administration for Chemistry of the Ministry for Heavy Industry was 82.6 million DME, of which 73.2 million DME were realized. 54/ The plan for its successor organization, the Main Administration for Chemistry of the State Secretariat for Chemicals, Stones, and Earths, was 144.6 million DME, of which 132.6 million DME were realized. 55/ The latter figure includes an increased number of chemical plants but no nonchemical plants. Soviet-owned corporations are not included in this total, with the possible exception of some plants transferred in 1950 and first picked up for planning purposes in the plans of the State Secretariat for Chemicals, Stones, and Earths. Soviet capital investment excluded from the total probably was at least 100 million DME.

In 1952 the plan for the Main Administration for Chemicals was 170 million DME, of which 163.141 DME were realized. 56/ Some Soviet-owned plants were returned in this year, resulting in a one-fifth reduction of the Soviet share of production of chemicals. If capital investment was reduced accordingly, the total Soviet investment was about 80 million DME.

In 1953, after several plan revisions and a major reorganization, it was announced that the capital investment in the new Chemical Area of the Ministry for Heavy Industry totaled 247 million DME. 57/ This figure is adjusted to include the investment in all the remaining Soviet-owned chemical plants, which were returned to East German ownership at the end of the year.

During 1954 there were two major plan revisions affecting capital investment in the Chemical Area of the Ministry for Heavy Industry. In March the plan was reduced from the earlier goal to 237.1 million DME. In May it was raised to 285.8 million DME. 58/ Fulfillment was announced as 98.5 percent, presumably of the final revised plan, and investment was 281.5 million DME. 59/

As of November 1954 the 1955 plan was 318.38 million DME. 60/ The final economic plan was adopted unusually late, in May of 1955, and no differing capital investment figure was indicated. Late adoption of the investment plan probably contributed to the underfulfillment. Investment in 1955, for instance, was 310 million DME.

The 1956 plan has been set at 385 million DME, on a preliminary basis. 61/ The total capital investment for the 5 years of the Second Five Year Plan (1956-60) may be 2.7 billion DME, according to preliminary information. 62/

The indicated total East German capital investment in the chemical industry during 1951-55 is 1,314 million DME,* including an estimated Soviet investment of 180 million DME in 1951 and 1952. The annual average was 263 million DME.

3. Czechoslovakia.

Capital investment in the chemical industry of Czechoslovakia from 1949 through 1953 was approximately 4.4 billion "new" crowns (on a constant cost basis, possibly the related plan costs). This was an annual average investment of 880 million "new" crowns. In 1954 and 1955 a total of about 1.9 billion "new" crowns was invested, or an annual average of 0.950 billion "new" crowns.

The original First Five Year Plan projected capital investment in the Czechoslovak chemical industry of 12.8 billion "old" crowns, based on 1948 prices, or 9.7 percent of total industrial capital investment. 63/ This figure excluded the plastics and rubber industries. Adjusting the data to include the latter, the chemical industry was to receive 11.2 percent of the total. When the First Five Year Plan was revised in 1951, no new information was released concerning capital investment, but because goals were raised generally, the ratio of planned chemical investment probably was not substantially changed.

In 1954 the total industrial capital investment during 1949-53 was announced as 40 billion "new" crowns. 64/ Eleven percent of

* This figure is not fully comparable with the First Five Year Plan goal, because of coverage differences and because of possible cost level differences. Use of the figure in Table 2, p. 34, below, involves assumption of no significant cost level changes during 1951-55.

this figure is 4.4 billion "new" crowns.* During 1954 and 1955, total capital investment was about 43 billion "new" crowns. 65/ Of this, about 40 percent went to industrial investment, if the 1955 rate is representative, 66/ or a total of 17.2 billion "new" crowns. If the chemical industry's share remained constant, the total investment in the chemical industry for the 2 years was about 1.9 billion "new" crowns, or an annual average of 0.950 billion "new" crowns.

4. Poland.

Information on capital investment in the chemical industry of Poland is inadequate for a firm estimate. Fortunately, the estimated effort appears to be consistent when it is compared with those in other countries, in terms of actual plants under construction.

Capital investment in the chemical industry has been consistently 10 percent of total industrial investment. This was true in 1948 and 1949, 67/ and the Six Year Plan (1950-55) displays the same relationship. 68/ According to the draft of the final law of the Six Year Plan, investment in the chemical industry was to total 172 billion "old" zlotys, or 5.160 billion "new" zlotys, but still on a converted 1948 cost level. This was 10.3 percent of the total planned industrial capital investment. Data on capital investment in chemicals in this instance include investment in the rubber industry.

It is important to note that industrial capital investment has been much higher than projected in the Six Year Plan -- at the expense of nonindustrial investment, since total capital investment has been fulfilling the plan. The acceleration of industrial investment probably has been accompanied by an acceleration of investment in the chemical industry. Because of this, the estimated 1950-55 capital investment in the chemical industry of Poland was 5.5 billion "new" zlotys, on a converted 1948 cost basis, or an annual average of 917 million "new" zlotys.

* The total industrial capital investment is ambiguous in coverage in context. Nonproductive investments may or may not be included; hence the same question applies to the derived total for investment in the chemical industry.

5. Hungary.

In the original First Five Year Plan (1950-54), the chemical industry of Hungary (including rubber processing) was to receive 2 billion forints (1950 cost level) of capital investment. 69/ The planned total was later revised to 4.1 billion forints. 70/ If the investment program for the chemical industry lagged as seriously as did the industrial investment program, total investment in the chemical industry was between 3.1 billion and 4.1 billion forints. If the midpoint of this range is taken as the best estimate, average annual capital investment was 720 million forints.

6. Rumania.

During 1951-55 the chemical industry of Rumania was to receive 31.5 billion "old" lei in 1950 values. The rubber industry was to receive an additional 3 billion "old" lei. 71/ This total of 34.5 billion "old" lei was equal to 1.725 billion "new" lei after the currency revaluation. It is probable that this investment was realized and would mean an annual average expenditure of 345 million "new" lei at the 1950 cost level.

According to data released in conjunction with the Second Five Year Plan (1956-60), capital investment in the chemical industry in the First Five Year Plan (1951-55) was 2.45 billion "new" lei. 72/ This figure is on a different cost basis, probably that of 1955, and includes extensive investment in the paper and cellulose industry not included in the estimated 1.725 billion "new" lei.

7. Bulgaria.

From 1949 through 1952, average annual capital investment in the chemical industry of Bulgaria was 142 million leva. From 1953 through 1955 the average was about 177 million leva.

The First Five Year Plan (1949-53) is the basic source of information on the period from 1949 through 1952. Although the plan extended through 1953, it was announced as having been completed in 1952.

The draft of the First Five Year Plan and the final law of the plan differed in significant details. They agreed on the planned aggregate scale of capital investment but differed as to

the distribution of that investment. Only the draft contained information on investment in the chemical industry, and that information is taken as the best estimate of planned investment. According to the draft, approximately 6.48 billion "new" leva (162 billion "old" leva) were to be invested in heavy industry. 73/ Of this, 10.5 percent, or 680 million "new" leva, was to be invested in the heavy chemical industry. This total,however, applies to 5 years.

There is no reason to suppose that the heavy chemical industry did not receive this ratio of investment; therefore, the ratio is used to derive an estimate of the 4-year investment total from announced data on the 4-year industrial investment total.

During 1949-52, capital investment in heavy industry probably was four-fifths of the announced total for industry, or 4.9 billion "new" leva. 74/ Investments in heavy chemistry would then be 514 million "new" leva. It is probable that investment in the rubber industry and in consumer chemicals (soap, cosmetics, and the like) would be at least 10 percent in addition, making the 4-year total about 570 million "new" leva, or an annual average of 142 million "new" leva.

From 1953 through 1955, total capital investment was about 12.8 billion "new" leva. Of this, about 48 percent was intended for industry, a total of 6.14 billion "new" leva. Of 6.14 billion "new" leva, 75 percent was for heavy industry, a total of 4.6 billion "new" leva, and an estimated 11.55 percent was for chemicals and rubber products, or a total of 531 million "new" leva. Thus annual average capital investment in the chemical industry was to be 177 million "new" leva.*

8. Communist China.

Planned capital investment in the chemical industry of Communist China is about 1.5 billion yuan for 1953-57, but progress appears to be lagging. Investment probably will not exceed 1.3 billion yuan, or an annual average of 260 million yuan.

According to the First Five Year Plan, 75/ the industrial ministries are to receive 24.85 billion yuan for capital investment. The Ministry of Heavy Industry, which controls the chemical industry, is to receive 6.49 billion yuan. This ministry includes the iron

* Data are based on plans, plan fulfillment reports, and budgetary information.

and steel industry, nonferrous metals, shipbuilding, construction materials, and a substantial portion of the chemical industry. Of these, the iron and steel industry probably would receive the largest investment for such projects as Anshan. It is doubtful that investment in the chemical industry would be more than 1.5 billion yuan. On the other hand, the chemical expansion program is ambitious, including major projects such as 5 nitrogenous fertilizer plants, so that the figure could hardly be less than 1 billion yuan. When the investment in chemical industries in other ministries, such as the pharmaceutical industry, is considered, 1.5 billion yuan appears reasonable as an estimate of the planned figure.*

9. North Korea.

Planned industrial capital investment in North Korea is 37.36 billion won for 1954-56. 76/ Of this amount, an estimated 10 percent would go to reconstruction of the chemical industry, a total of 3.736 billion won and an annual average of 1.245 billion won.

* The estimate includes about 20 percent for nonproductive investment.

Table 2

Derivation of Ruble Estimates of Annual Average Capital Investment in the Chemical Industries of the Sino-Soviet Bloc

Annual Average Investment [a]	1953 Conversion to Rubles [b]	Ruble Value (Billions)
USSR (1951-55) 6.3 billion rubles	1.00	6.30
Poland (1951-55) 0.917 billion "new" zlotys	1.00	0.917
Czechoslovakia (1951-55) 0.908 billion "new" crowns [c]	0.5556	0.504
East Germany (1951-55) 0.263 billion DME	1.80	0.473
Communist China (1952-57) 0.260 billion yuan	1.707	0.444
Hungary (1951-55) 0.720 billion forints	0.341	0.246
Rumania (1951-55) 0.345 billion "new" lei	0.6667	0.230
Bulgaria (1951-55) 0.160 billion "new" leva [d]	0.5882	0.094
North Korea (1954-56 Plan) 1.245 billion won	0.0333	0.041

a. Estimates are derived in this appendix except as noted.
b. Ratios with the exception of those for China and North Korea are given in source 77/.
c. Adjusted after consideration of 1949-53 and 1954-55 levels of expenditure.
d. Adjusted after consideration of 1949-52 and 1953-55 levels of expenditure.

APPENDIX C

GAPS IN INTELLIGENCE

There are four major gaps in intelligence concerning capital investment in the chemical industries of the Sino-Soviet Bloc, as follows:

1. Little information is available from the annual Capital Investment Plans of the various countries concerning the extent of capital investment in the chemical industry. Detailed information must exist, but it is closely held. Its great importance lies in its potential indications value, such as signaling shifts of investment in support of a mobilization program.

2. More data are needed concerning the extent of capital investment in individual major plants, especially in the USSR.

3. There is need of a capital investment unit-cost deflator for each of the countries so that real fluctuations in the extent of investment may be studied without distortion from general cost movements.

4. A ruble-dollar ratio is needed to convert the ruble value of capital investment in the chemical industry to a contemporary dollar value.

APPENDIX D

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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